About OMICS Group

OMICS Group International is an amalgamation of Open Access publications and worldwide international science conferences and events. Established in the year 2007 with the sole aim of making the information on Sciences and technology 'Open Access', OMICS Group publishes 400 online open access scholarly journals in all aspects of Science, Engineering, Management and Technology journals. OMICS Group has been instrumental in taking the knowledge on Science & technology to the doorsteps of ordinary men and women. Research Scholars, Students, Libraries, Educational Institutions, Research centers and the industry are main stakeholders that benefitted greatly from this knowledge dissemination. OMICS Group also organizes 300 International conferences annually across the globe, where knowledge transfer takes place through debates, round table discussions, poster presentations, workshops, symposia and exhibitions.

About OMICS Group Conferences

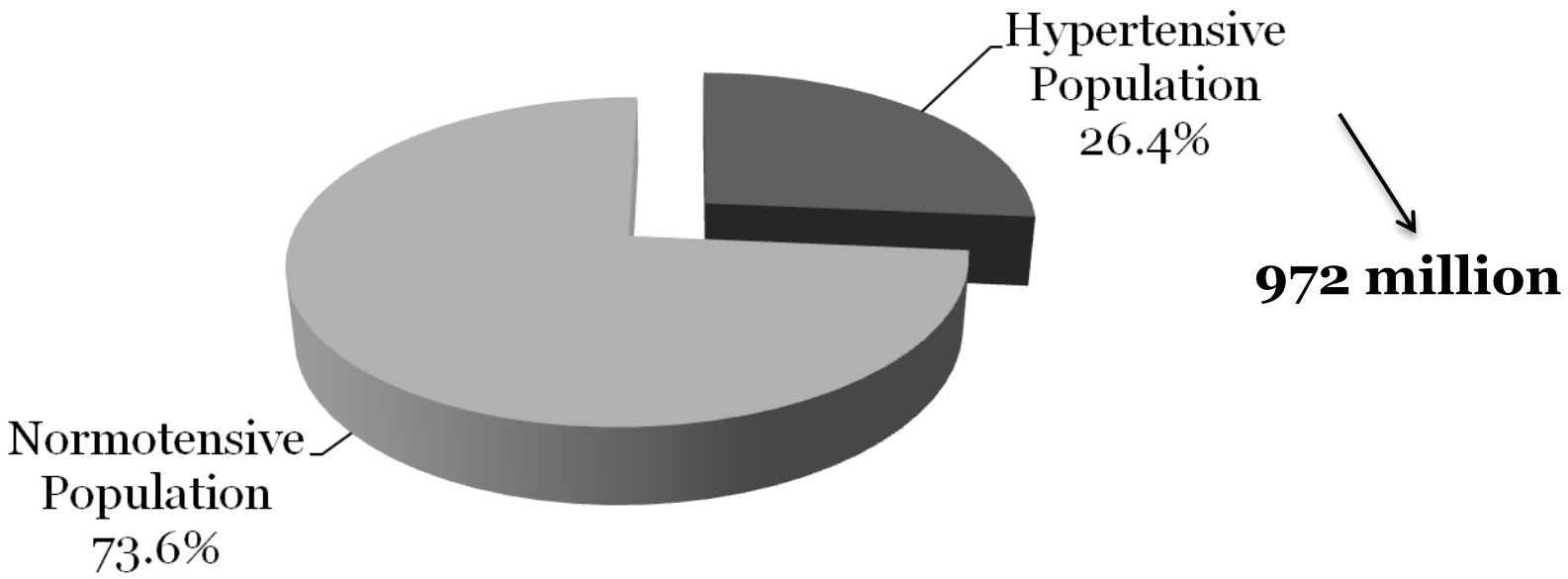
OMICS Group International is a pioneer and leading science event organizer, which publishes around 400 open access journals and conducts over 300 Medical, Clinical, Engineering, Life Sciences, Pharma scientific conferences all over the globe annually with the support of more than 1000 scientific associations and 30,000 editorial board members and 3.5 million followers to its credit.

OMICS Group has organized 500 conferences, workshops and national symposiums across the major cities including San Francisco, Las Vegas, San Antonio, Omaha, Orlando, Raleigh, Santa Clara, Chicago, Philadelphia, Baltimore, United Kingdom, Valencia, Dubai, Beijing, Hyderabad, Bengaluru and Mumbai.

Targeting Hypertension in Patients with the Cardio-Renal Metabolic Syndrome

Edward Rojas, M.D.
Endocrine and Metabolic Diseases Research Center
University of Zulia
Venezuela

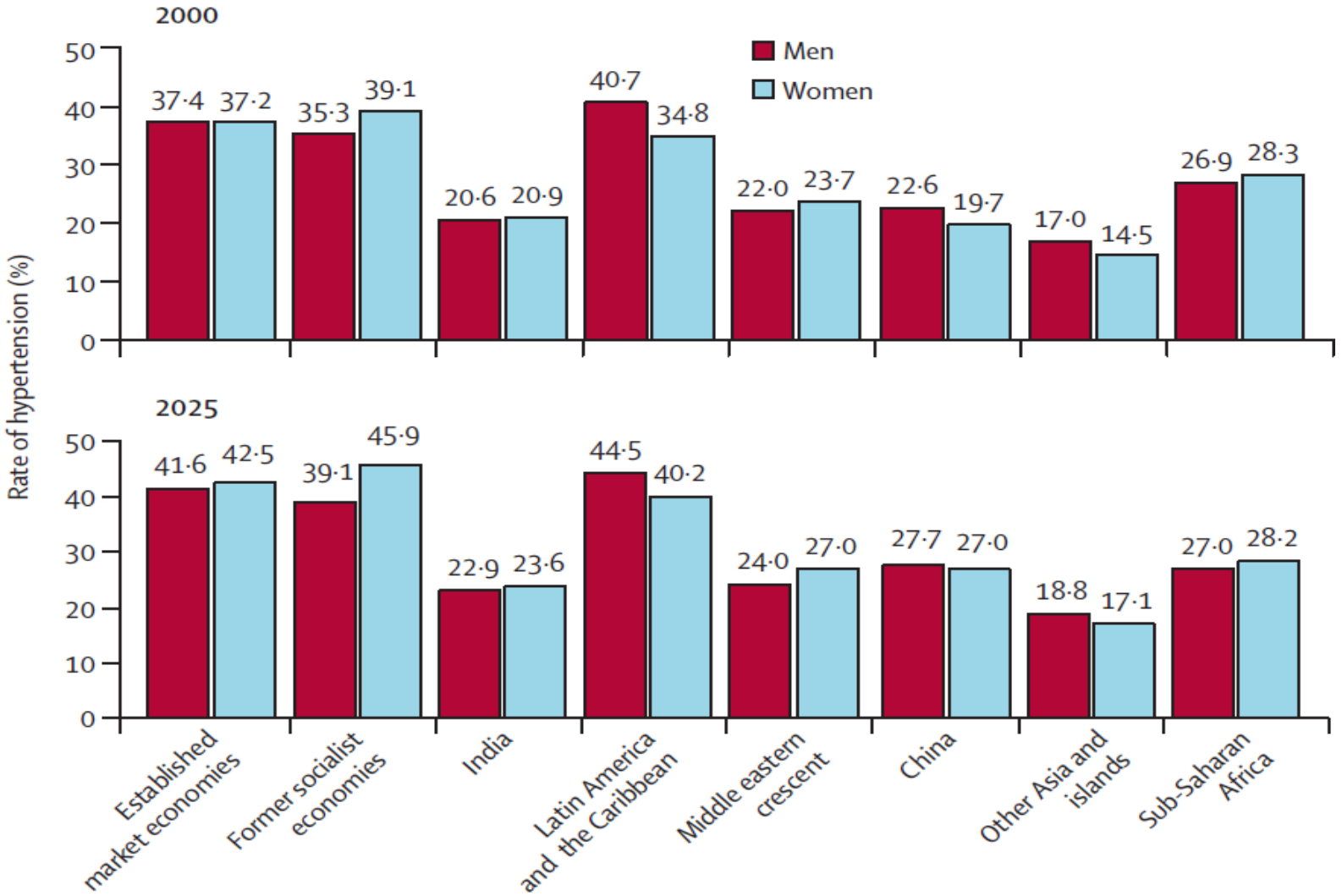
Worldwide Prevalence of Hypertension in 2000 (%)



In 2025 it was predicted to increase by about 60% to a total of 1·56 billion (1·54–1·58 billion).

Patricia M Kearney, Megan Whelton, Kristi Reynolds, Paul Muntner, Paul K Whelton, Jiang He. **Global burden of hypertension: analysis of worldwide data**. *Lancet 2005; 365: 217–23.*

Prevalence of Hypertension in people aged 20 years or older by world region and sex in 2000 and 2025

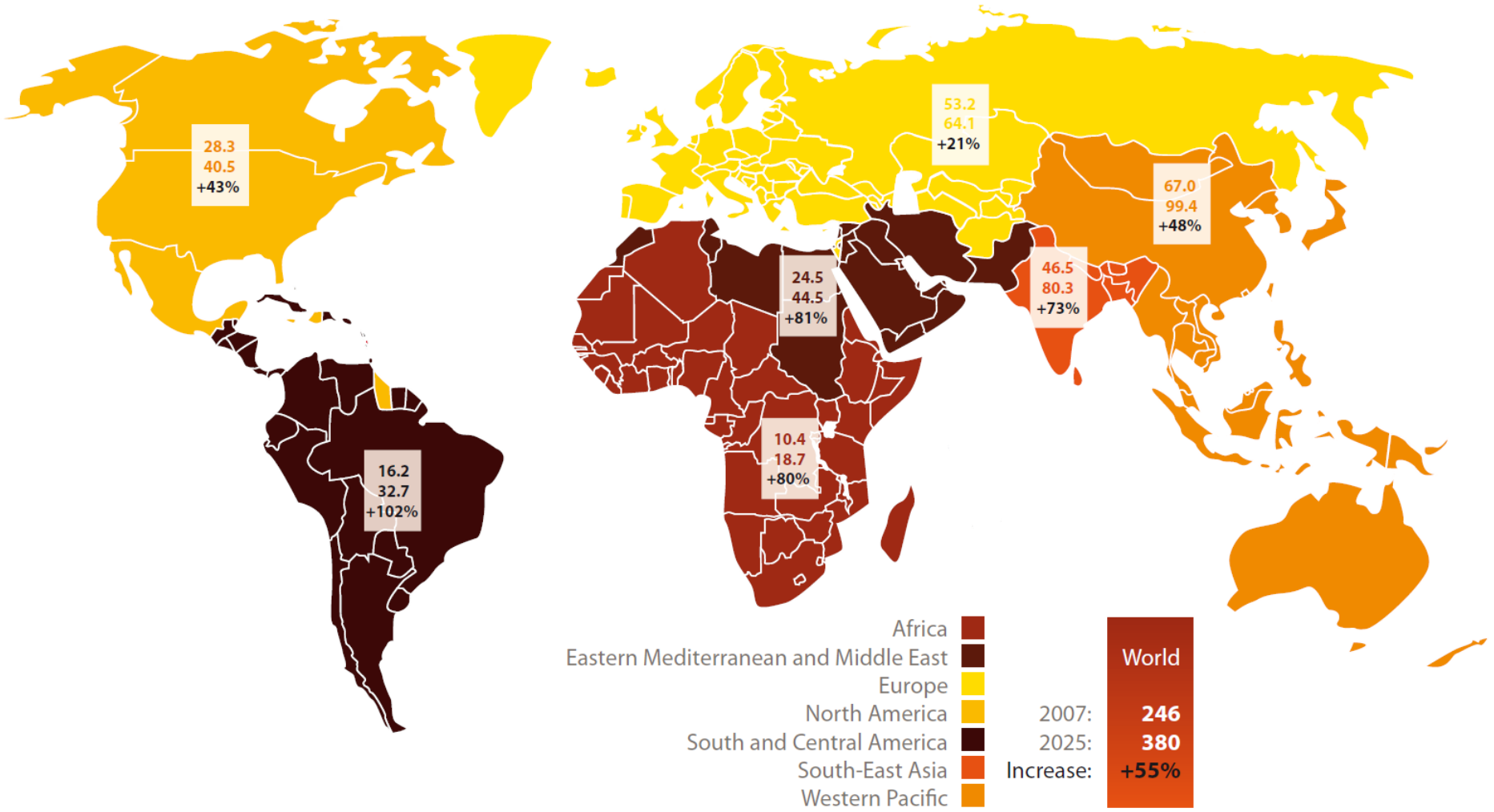


Patricia M Kearney, Megan Whelton, Kristi Reynolds, Paul Muntner, Paul K Whelton, Jiang He. **Global burden of hypertension: analysis of worldwide data**. *Lancet 2005; 365: 217–23.*

"High blood pressure is a **powerful**, **consistent**, and **independent risk factor** for cardiovascular disease and renal disease"

Thomas G. Pickering, MD, DPhil; John E. Hall, PhD; Lawrence J. Appel, MD; Bonita E. Falkner, MD; John Graves, MD; Martha N. Hill, RN, PhD; Daniel W. Jones, MD; Theodore Kurtz, MD; Sheldon G. Sheps, MD; Edward J. Roccella, PhD, MPH. **Recommendations for Blood Pressure Measurement in Humans and Experimental Animals Part 1: Blood Pressure Measurement in Humans A Statement for Professionals From the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research.** ***Hypertension. 2005;45:142-161***

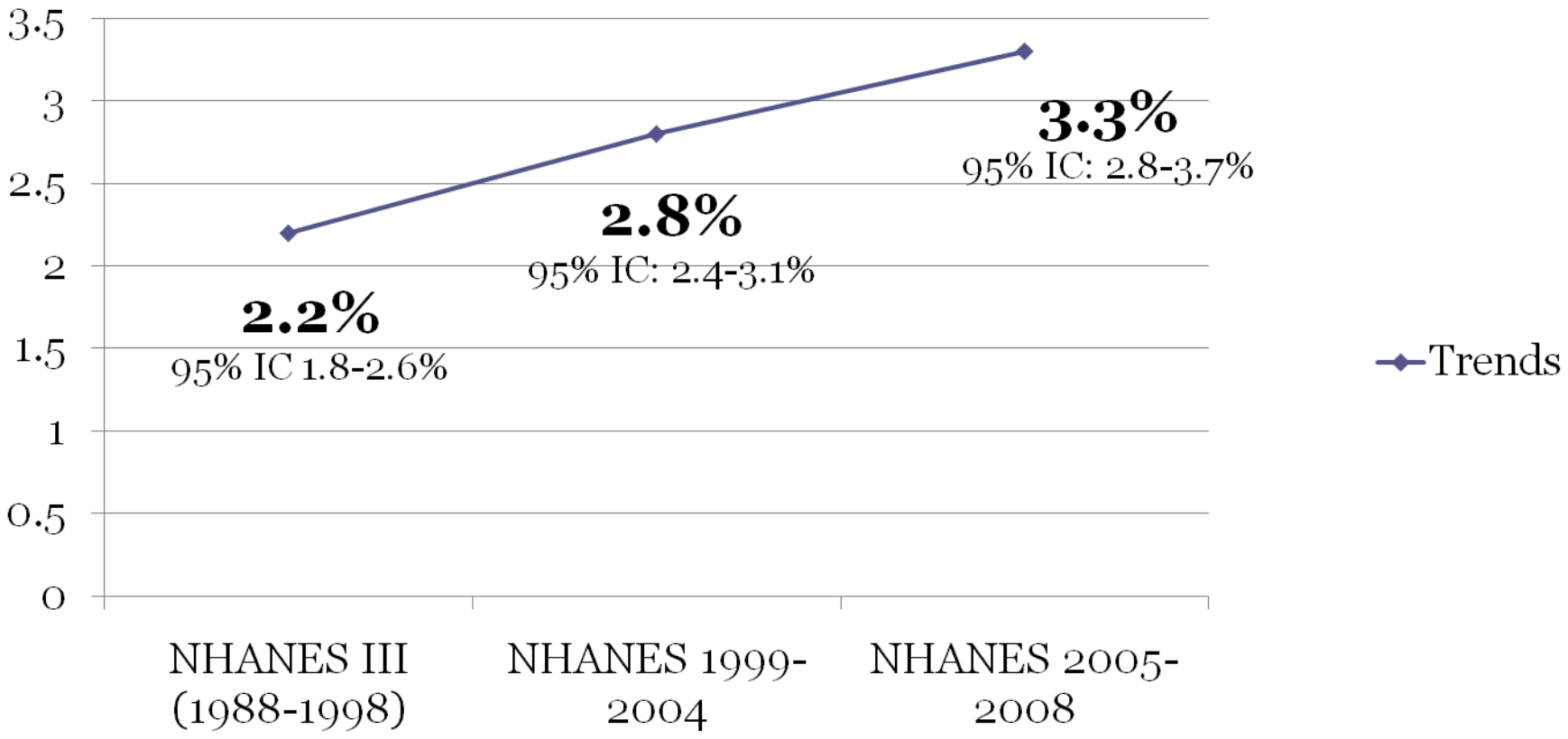
Global projections for the number of people with diabetes (20-79 age group), 2007-2025 (millions)



International Diabetes Federation. *Annual Report – 2010*. Available at: http://www.idf.org/sites/default/files/Annual-Report-2010-FINAL-EN_0.pdf

International Diabetes Federation. The Diabetes Atlas. Third Edition. Brussels: International Diabetes Federation; 2006

Prevalence of Diabetic Kidney Disease in the US



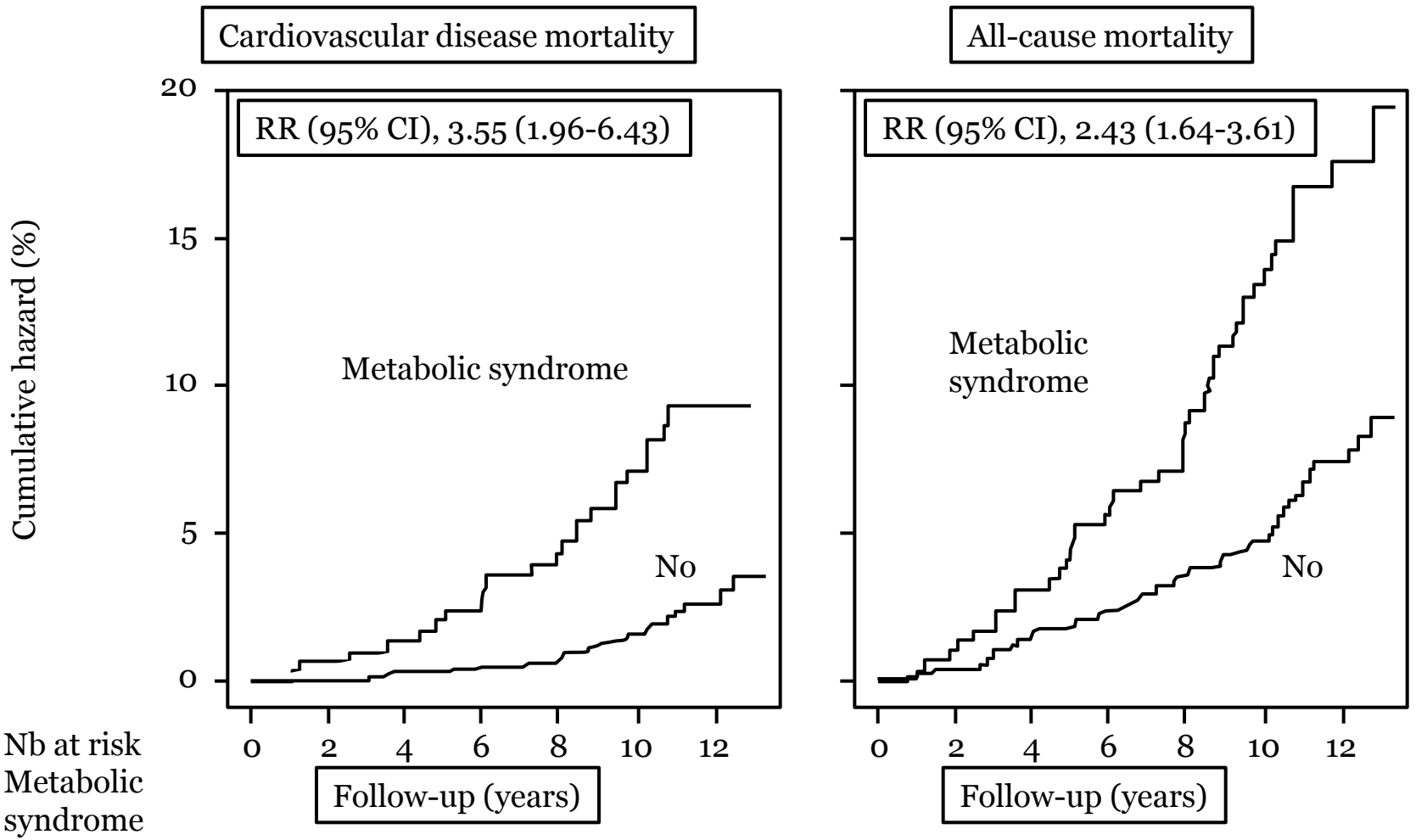
Ian H. de Boer, Tessa C. Rue, Yoshio N. Hall, Patrick J. Heagerty, Noel S. Weiss, Jonathan Himmelfarb. **Temporal Trends in the Prevalence of Diabetic Kidney Disease in the United States.** *JAMA. 2011;305(24):2532-2539.*

1.- VENEZUELA. VEINTICINCO PRINCIPALES CAUSAS DE MUERTE DIAGNOSTICADA, 2006.

	CAUSAS DE MUERTE	Mortalidad Diagnosticada	Porcentajes (1)
1	**Enfermedades del corazón (I05-I09, I11, I13, I21-I51)**	**24.977**	**20,63%**
	Infarto agudo del miocardio (I21)	15.379	12,70%
	Enfermedad cardiaca hipertensiva (I11)	2.976	2,46%
	Enfermedad isquemica crónica del corazón (I25)	2.653	2,19%
2	**Cáncer. (C00-C97)**	**18.543**	**15,32%**
	Tumores malignos de los órganos digestivos. (C15-C26)	5.160	4,26%
	Tumores malignos de los órganos respiratorios e intratoráicos incluye: oido medio. (C30-C39)	3.145	2,60%
	Tumores malignos de los órganos genitales femeninos. (C51-C58)	2.141	1,77%
3	**Suicidios y Homicidios. (X60-Y09). (2)**	**9.748**	**8,05%**
	Homicidios. (X85-Y09). (2)	8.805	7,27%
	Suicidios. (X60-X84). (2)	943	0,78%
4	**Enfermedades Cerebrovasculares. (I60-I69)**	**9.391**	**7,76%**
	Hemorragia intraencefalica (I61)	2.978	2,46%
	Otras enfermedades cerebrovasculares (I67)	2.173	1,79%
	Accidente vascular encefálico agudo, no especificado como hemorrágico o isquémico (I64)	1.576	1,30%
5	**Accidentes de Todo Tipo. (V01-X59). (2)**	**9.353**	**7,69%**
	Accidentes de Trafico de Vehiculos de Motor. (V01-V89). (2)	6.218	5,11%
	Otros Accidentes. (V90-X59). (2)	3.135	2,58%
6	**Diabetes. (E10-E14)**	**7.181**	**5,91%**
7	**Ciertas afecciones originadas en el período perinatal. (P00-P96) (3)**	**4.959**	**4,10%**
	Trastornos respiratorios y cardiovasculares especificos del periodo perinatal. (P20-P29) (3)	3.162	2,61%
	Infecciones especificas del periodo perinatal. (P35-P39). (3)	797	0,66%
	Feto y recién nacido afectados por factores maternos y por complicaciones del embarazo, del trabajo de parto y del parto (P00-P04) (3)	527	0,44%
8	**Enfermedades crónicas de las vías respiratorias inferiores. (J40-J47)**	**3.225**	**2,66%**
9	**Influenza y neumonía. (J10-J18)**	**2.856**	**2,36%**
	Neumonia. (J12-J18)	2.839	2,35%
	Influenza debida a virus no identificado (J11)	17	0,01%
10	**Enfermedades del hígado. (K70-K77)**	**2.483**	**2,05%**
	Cirrosis y fibrosis Hepática. (K70.2, K70.3, K74)	1.769	1,46%
	Enfermedad alcohólica del hígado (K70)	259	0,21%
	Otras enfermedades del hígado (K76)	202	0,17%
11	**Anomalías congénitas. (Q00-Q99)**	**2.212**	**1,83%**
12	**Enfermedad por virus de la inmunodeficiencia humana [VIH]. (B20-B24)**	**1.567**	**1,29%**
13	**Tumores benignos y de comportamiento incierto o desconocido. (D10-D48)**	**1.549**	**1,28%**
14	**Nefritis y Nefrosis. (N00-N19, N25-N29)**	**1.480**	**1,22%**
	Insuficiencia renal crónica (N18)	1.071	0,88%
	Insuficiencia renal aguda (N17)	106	0,09%
	Insuficiencia renal no especificada (N19)	93	0,08%

Anuario de Mortalidad 2006. Ministerio del Poder Popular para la Salud. Venezuela

Cardiovascular Disease and all Cause Mortality are Increased in Men with Metabolic Syndrome



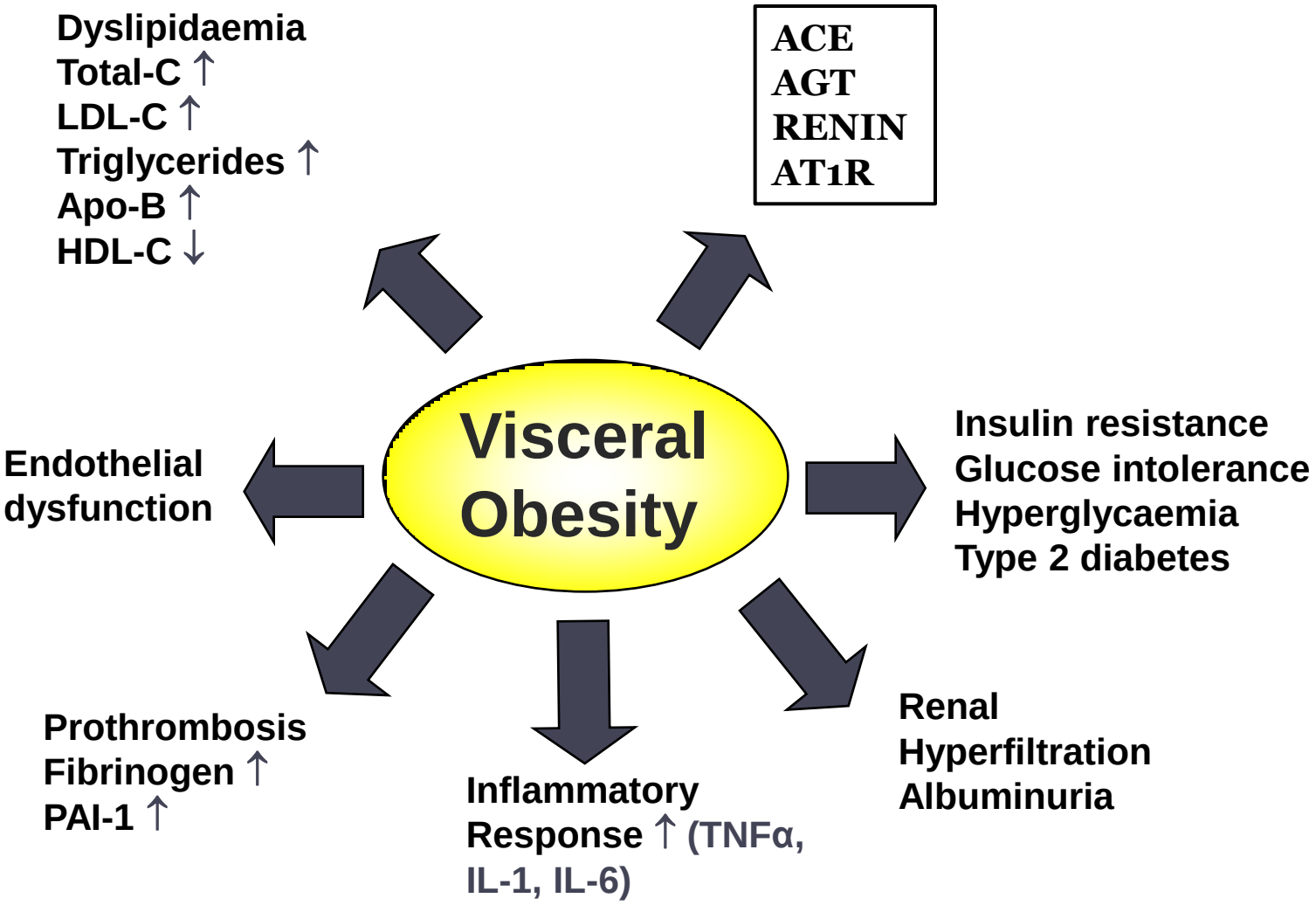
Nb at risk Metabolic syndrome								
Yes	866	852	834	292	866	852	834	292
No	288	279	234	100	288	279	234	100

Lakka HM et al. JAMA 2002; 288:2709

Hypertension and Diabetes Mellitus

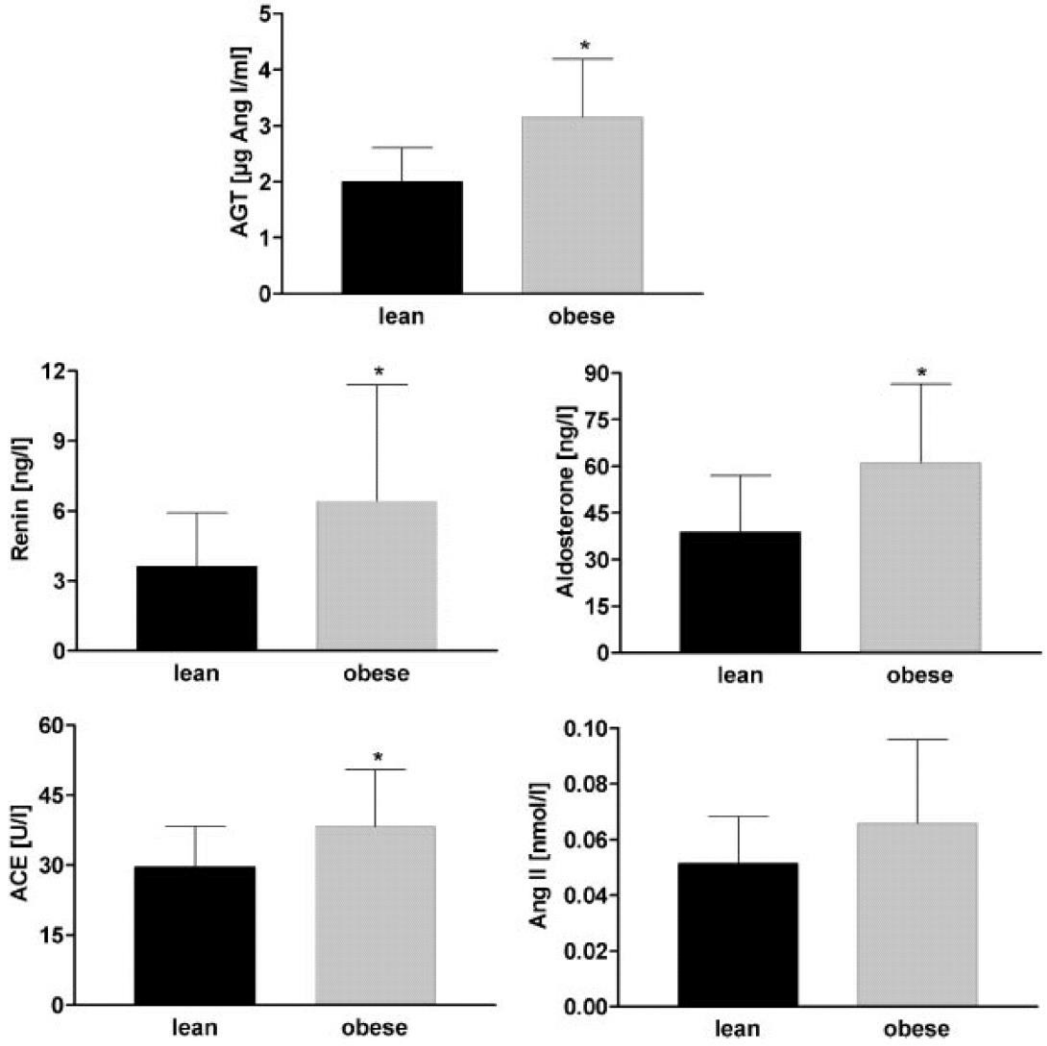
Pathophysiology

Obesity and Cardiovascular Risk



AM. Sharma. **Adipose tissue: a mediator of cardiovascular risk. International Journal of Obesity**. *(2002) 26, Suppl 4, S5–S7 2002*

The Renin-Angiotensin System is Activated in Obese Women



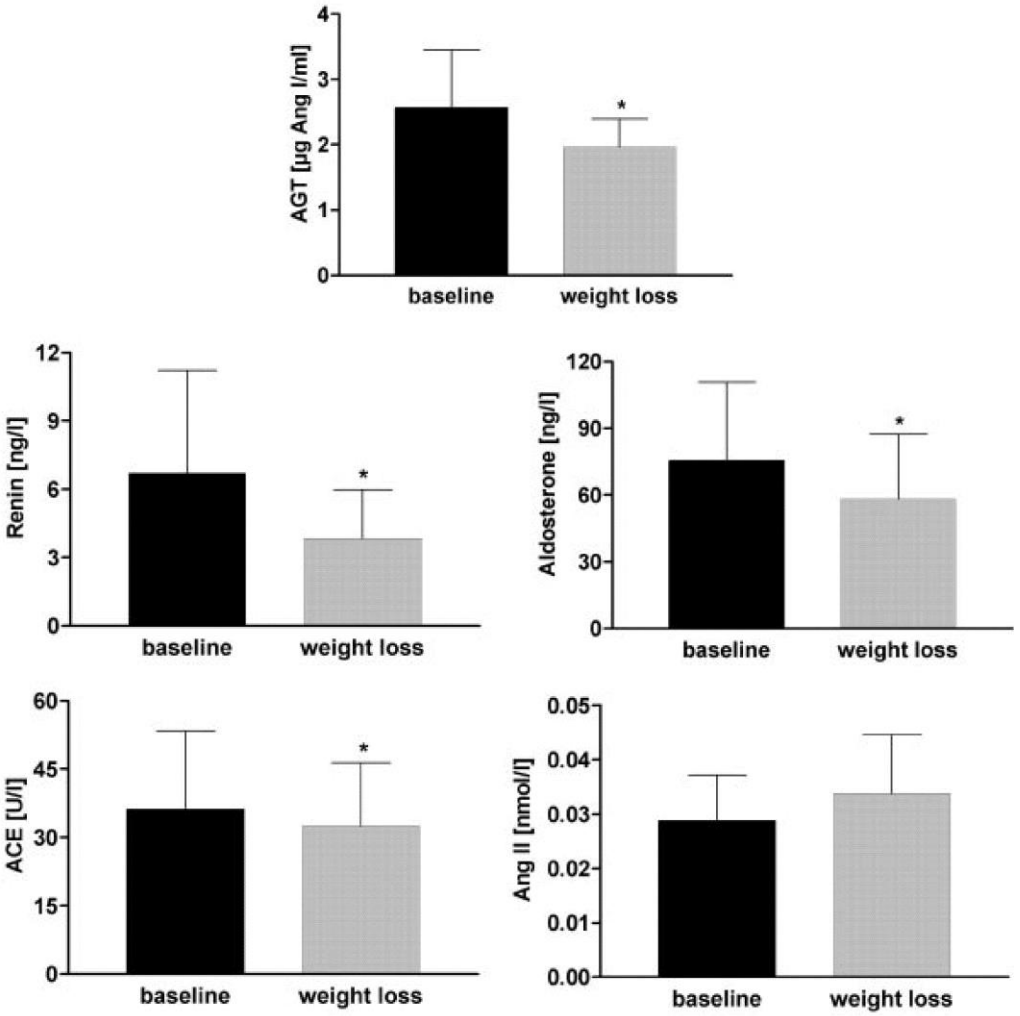
Comparison of circulating renin-angiotensin-aldosteron system between 19 lean and 19 obese postmenopausal women.

Data given as mean±SD

*P<0.05

Stefan Engeli et al. **Weight Loss and the Renin-Angiotensin-AldosteroneSystem**. *Hypertension. 2005;45:356*

Activation of RAS is Reduced by Weight Loss



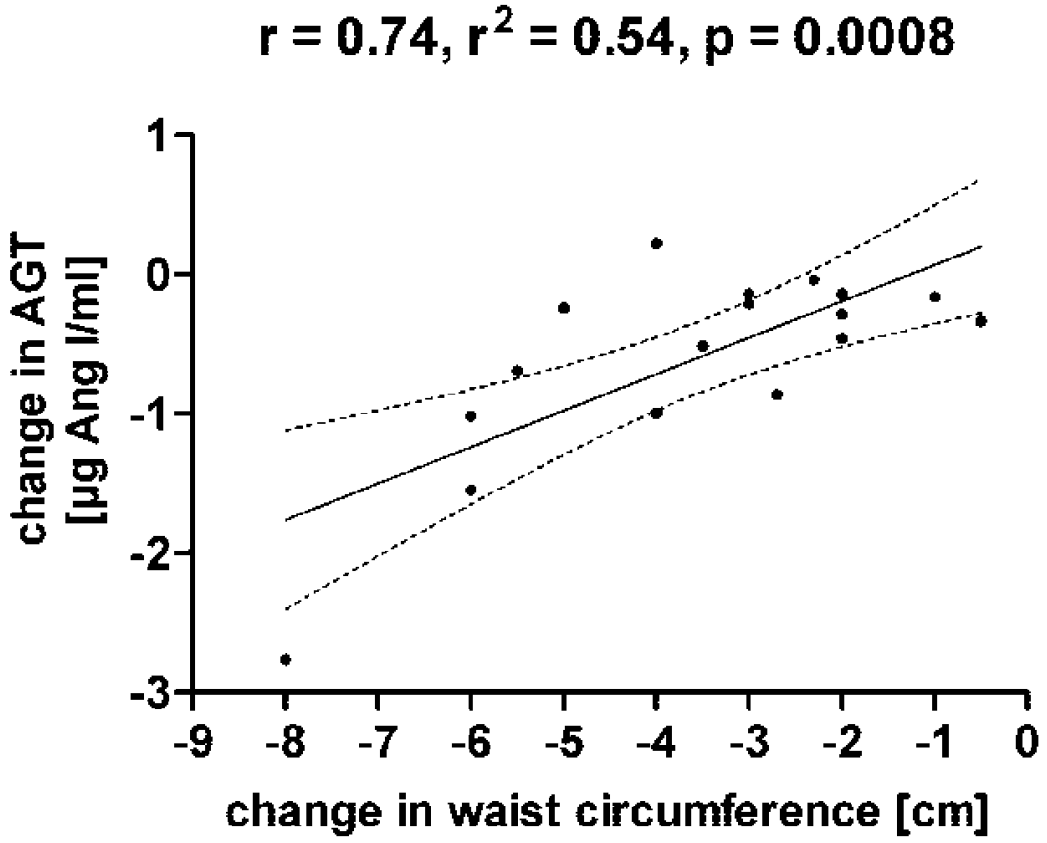
The circulating renin-angiotensin-aldosteron system before and after 5% weight loss in 17 obese post-menopausal women

Data given as mean±SD

*P<0.05

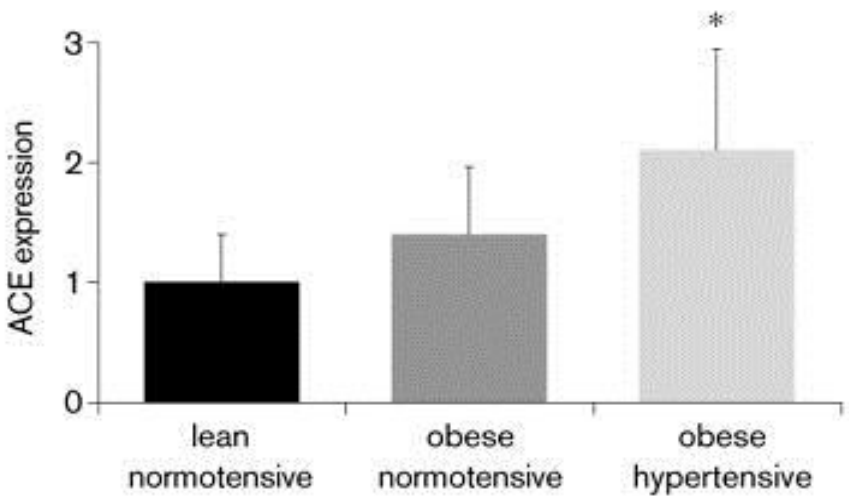
Stefan Engeli et al. **Weight Loss and the Renin-Angiotensin-AldosteroneSystem.** *Hypertension. 2005;45:356*

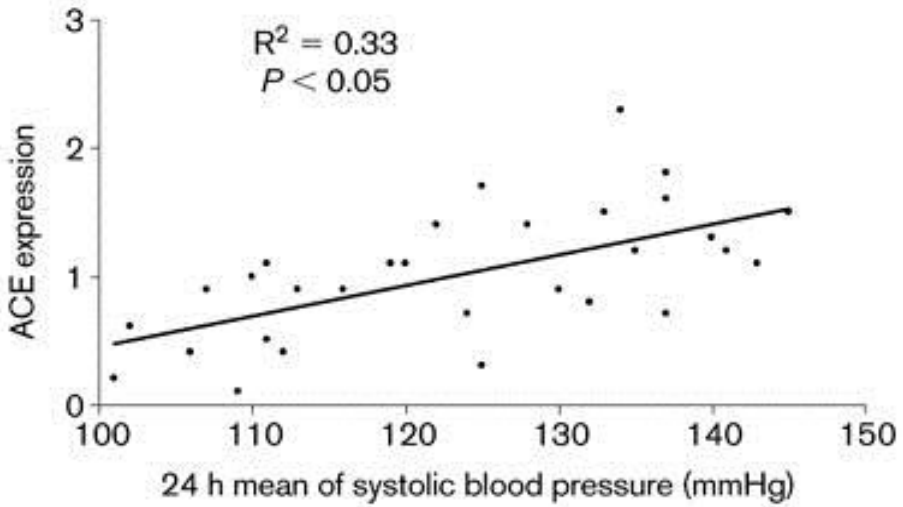
Relationship Between Reduction in Waist Circumference and Circulating Angiotensinogen

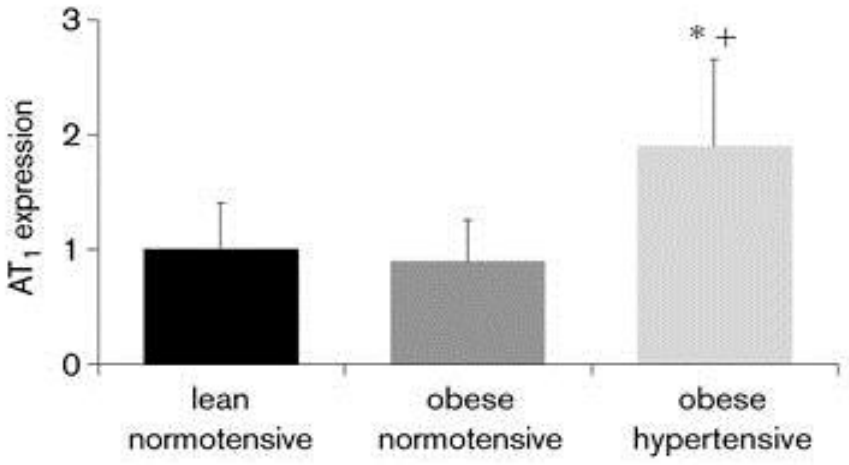


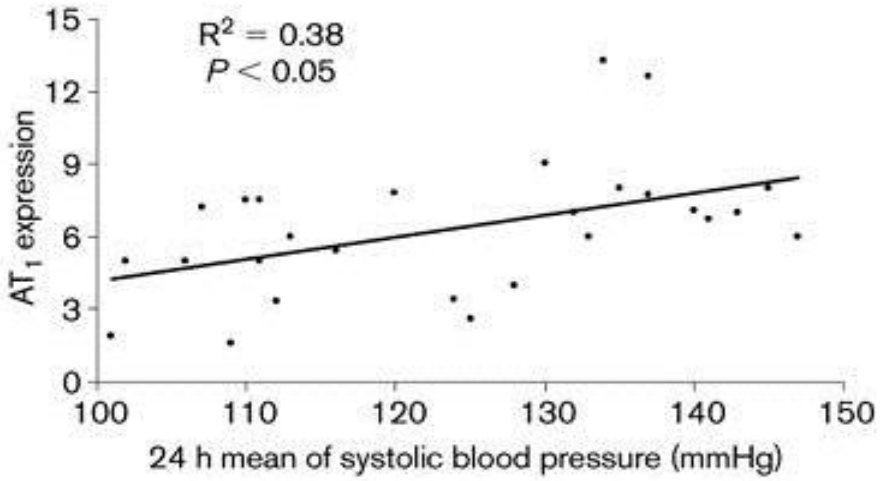
Stefan Engeli et al. **Weight Loss and the Renin-Angiotensin-AldosteroneSystem.** *Hypertension. 2005;45:356*

Upregulation of ACE and AT_1R Genes In Isolated Subcutaneous Abdominal Adipocytes



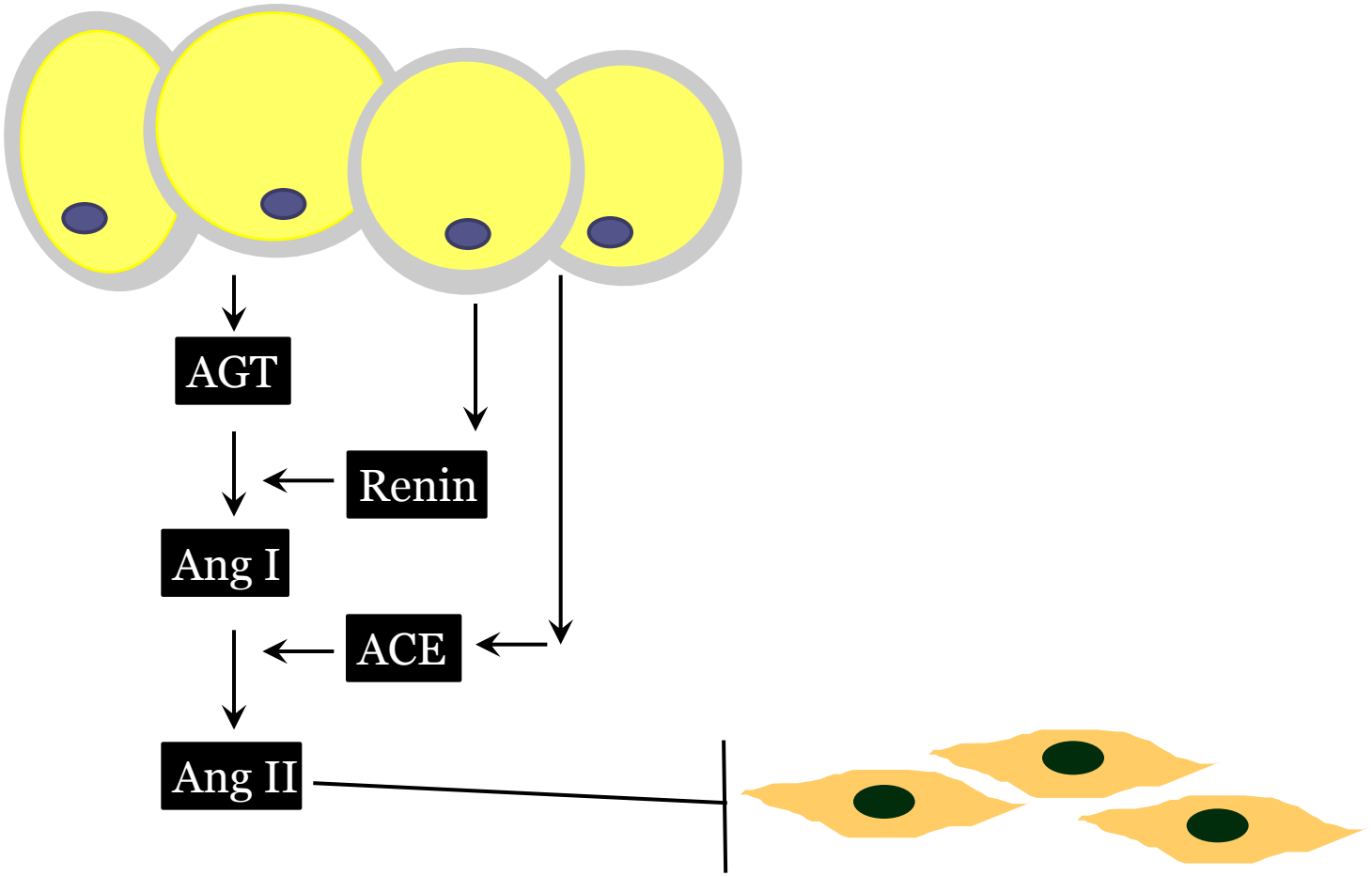






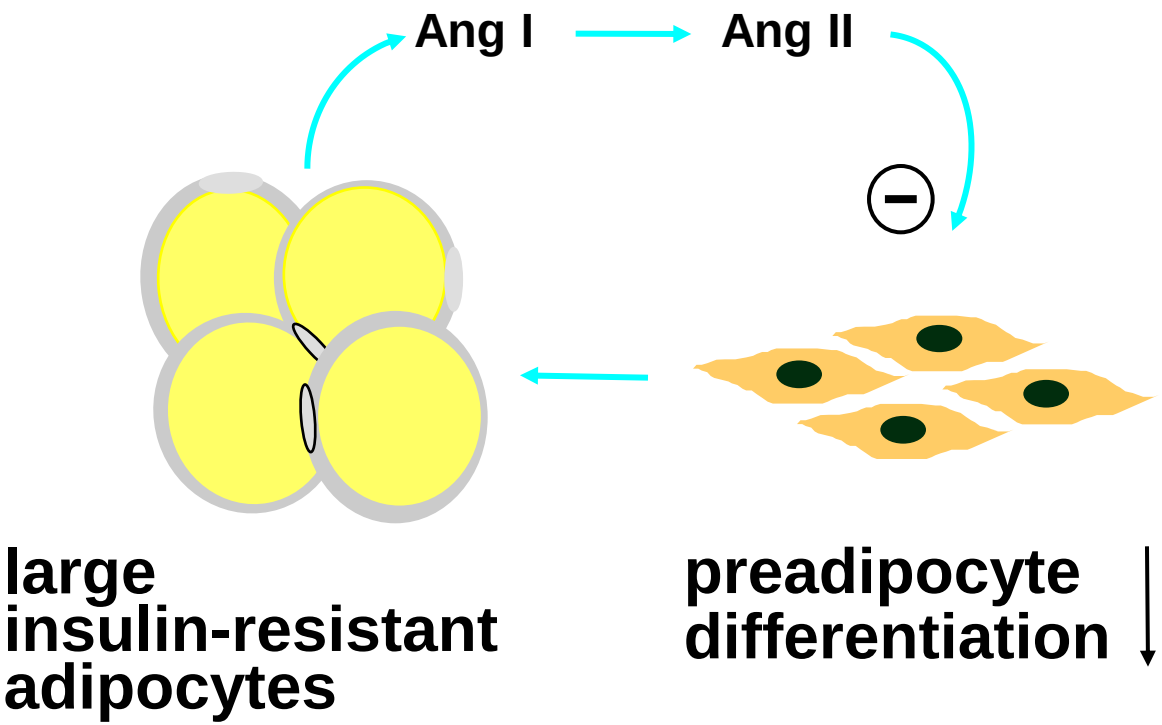
Gorzelniak K et al. **Hormonal regulation of the human adipose-tissue renin-angiotensin system: relationship to obesity and hypertension.** *J Hypertens. 2002;20(5):965*

Angiotensin II Inhibits Adipogenic Differentiation of Human Preadipocytes



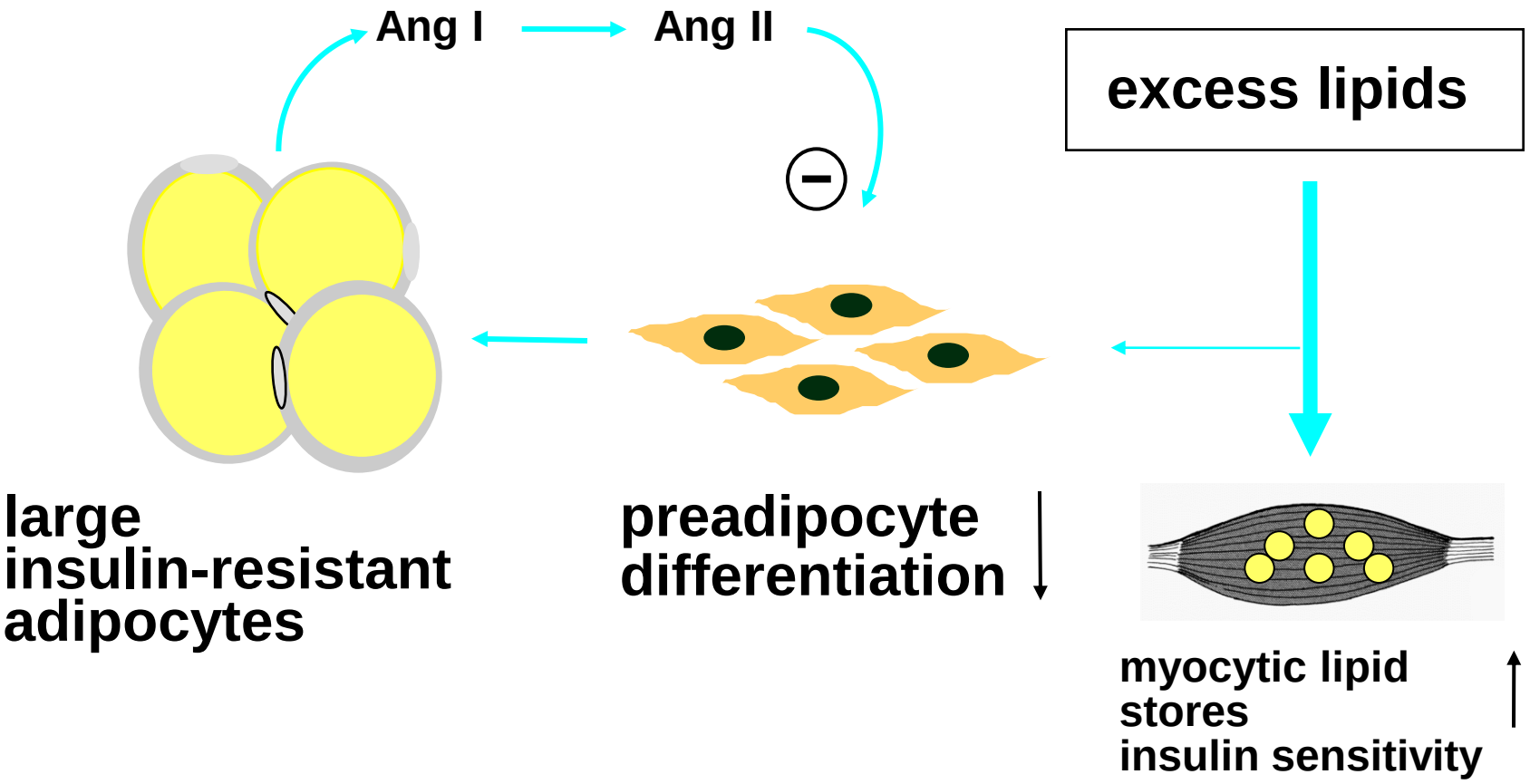
Janke et al., Diabetes 2003

Ang II Inhibits Adipocyte Differentiation and Promotes Myocytic Lipid Deposition



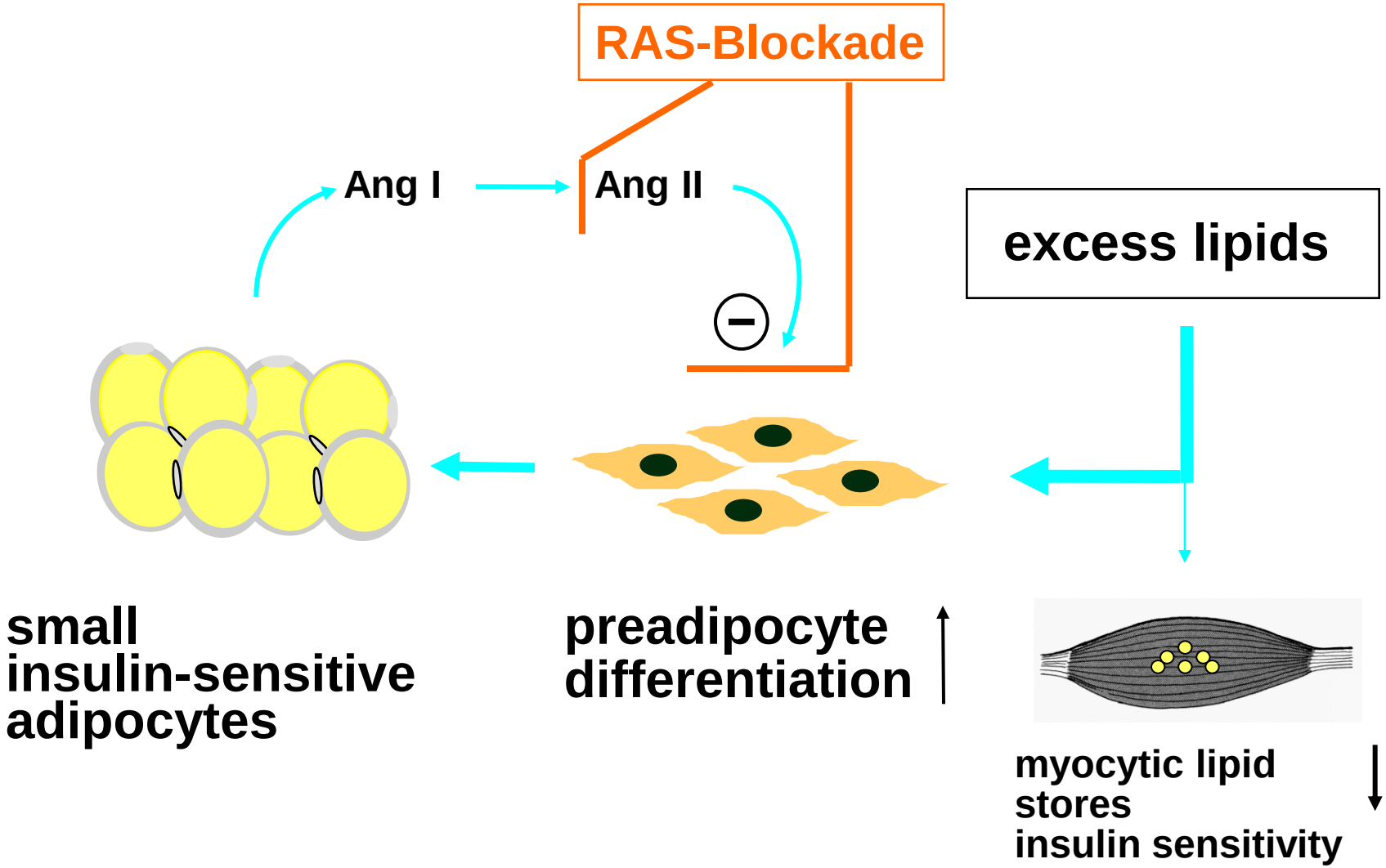
Arya M. Sharma et al. **Angiotensin Blockade Prevents Type 2 Diabetes by Formation of Fat Cells**. *Hypertension. 2002;40:609-611*

Ang II Inhibits Adipocyte Differentiation and Promotes Myocytic Lipid Deposition



Arya M. Sharma et al. **Angiotensin Blockade Prevents Type 2 Diabetes by Formation of Fat Cells.** *Hypertension. 2002;40:609-611*

Ang II Inhibits Adipocyte Differentiation and Promotes Myocytic Lipid Deposition



Arya M. Sharma et al. **Angiotensin Blockade Prevents Type 2 Diabetes by Formation of Fat Cells.** *Hypertension. 2002;40:609-611*

Skeletal muscle phenotypic characteristics of patients with hypertension that predispose to insulin resistance

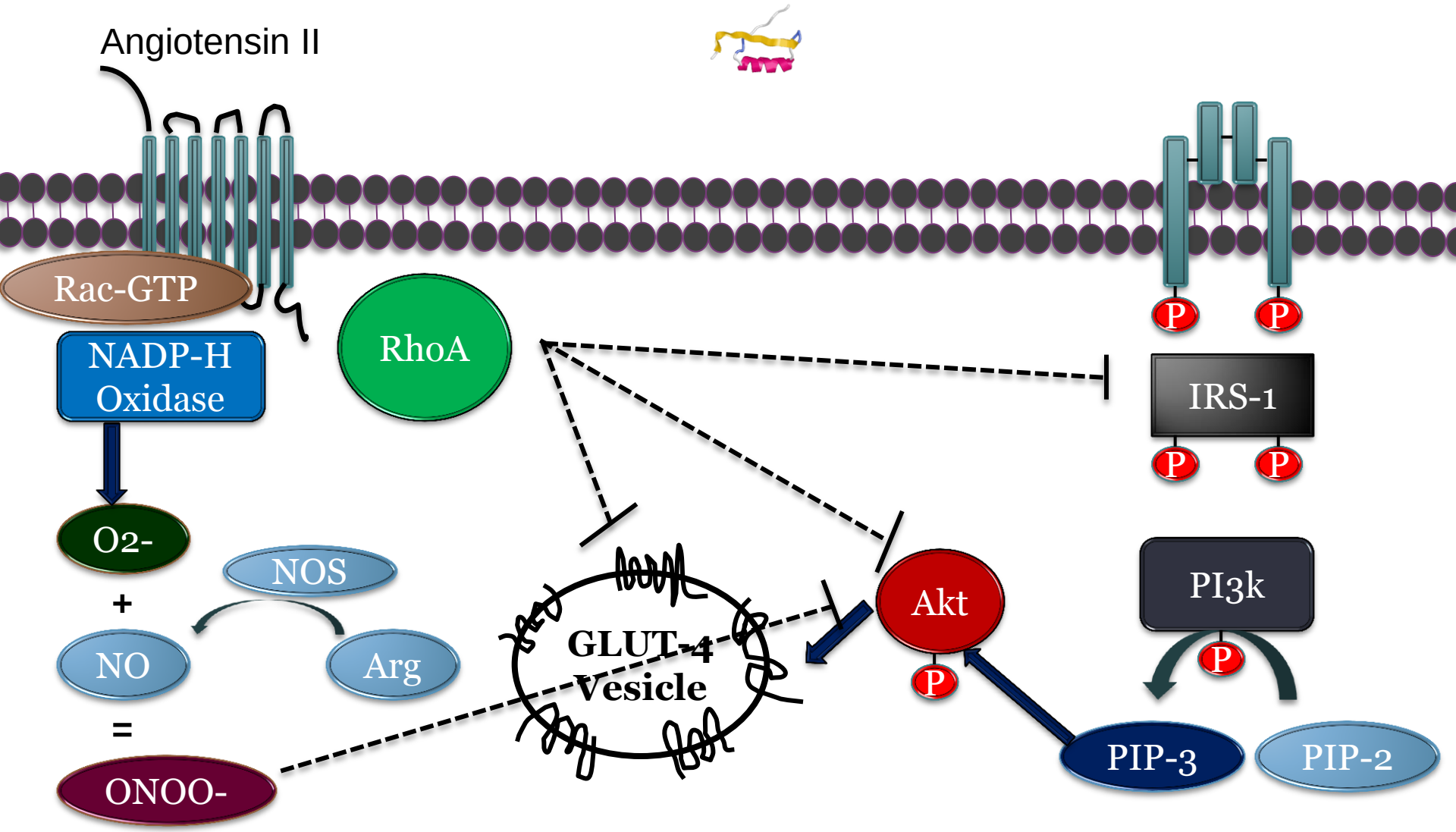
1. Altered composition of skeletal muscle tissue (less slow-twitch insulin-sensitive muscle fibers and increased fat interspersed between skeletal muscle fibers).

2. Decreased blood flow and delivery of insulin and glucose to skeletal muscle tissue due to vascular hypertrophy and vasoconstriction.

3. **Postreceptor abnormalities in metabolic signaling responses to insulin in skeletal muscle tissue.**

James R. Sowers. **Treatment of Hypertension in Patients With Diabetes.** ARCH INTERN MED/VOL 164, SEP 27, 2004

Skeletal Muscle Cell



James R. Sowers. **Insulin resistance and hypertension**. *Am J Physiol Heart Circ Physiol 286: H1597–H1602, 2004*
James R. Sowers. **Treatment of Hypertension in Patients With Diabetes.** *Arch Intern Med. 2004;164:1850-1857*

Hypertension and Diabetes Mellitus

Therapeutics

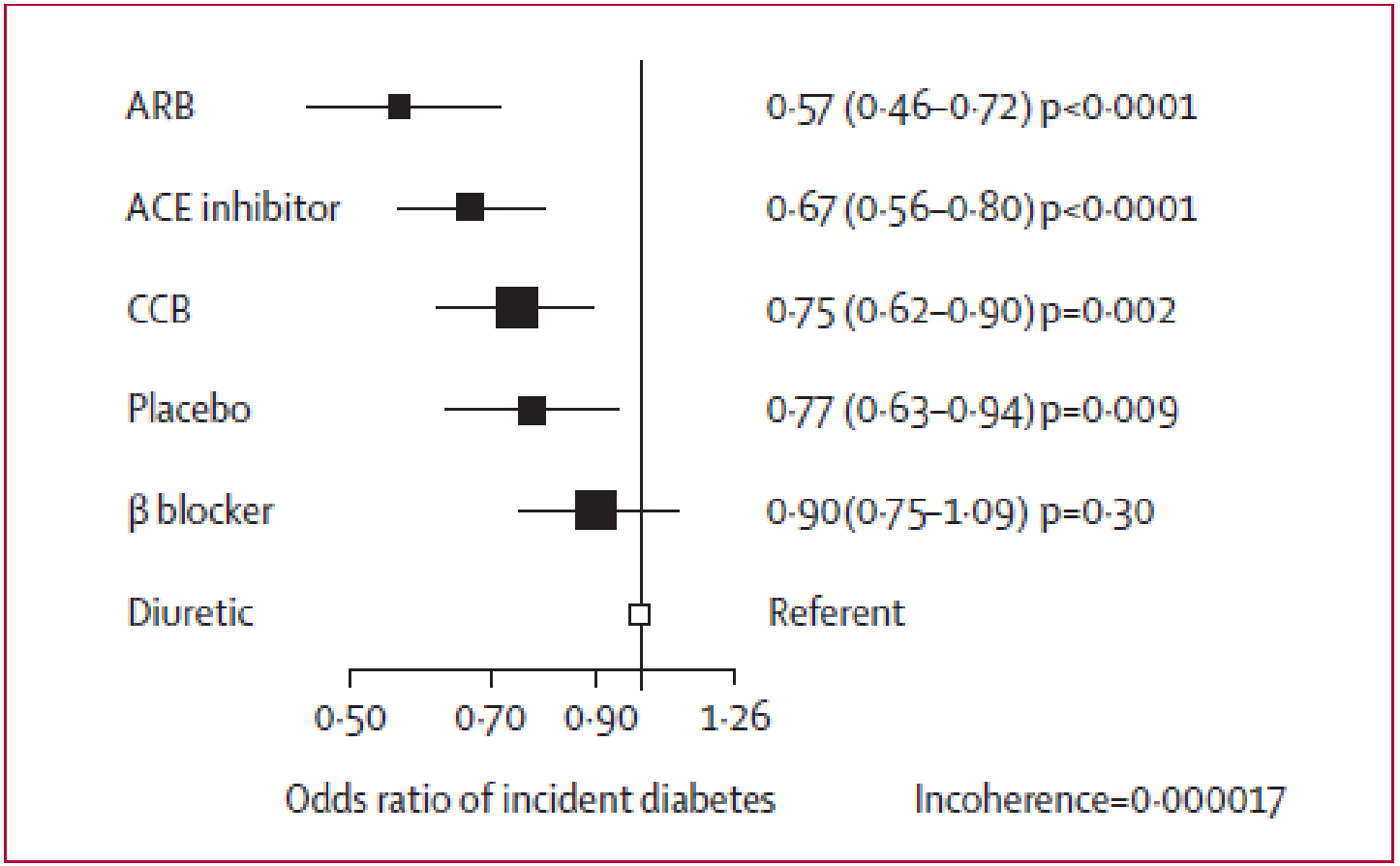
Facts:

"Hypertensive patients who were taking B-blockers had a **28% higher risk of development of diabetes** compared with those taking no antihypertensive medications"

"Potential mechanisms by which B-blockers may increase insulin resistance **include weight gain and decreased blood flow to skeletal muscle tissues**"

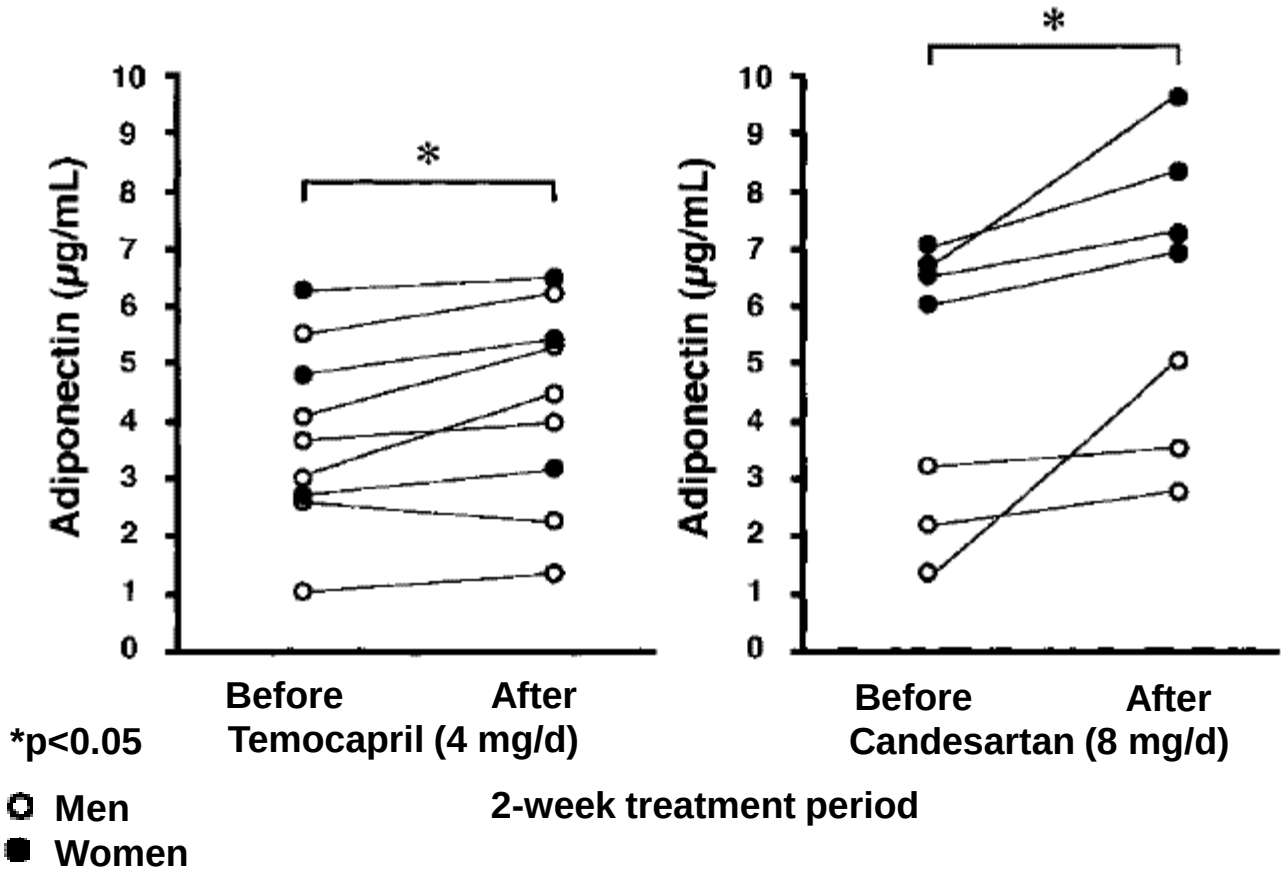
Griess TW, Nieto FJ, Shahar E, et al. **Hypertension and antihypertensive therapy as risk factors for type 2 diabetes mellitus: Atherosclerosis Risk in Communities Study.** *N Engl J Med. 2000;342:* 905-912.
Sowers JR, Bakris GL. **Antihypertensive therapy and the risk of type 2 diabetes mellitus**. *N Engl J Med. 2000;342:969-970.*

New Onset Diabetes Mellitus and Antihypertensive Therapy



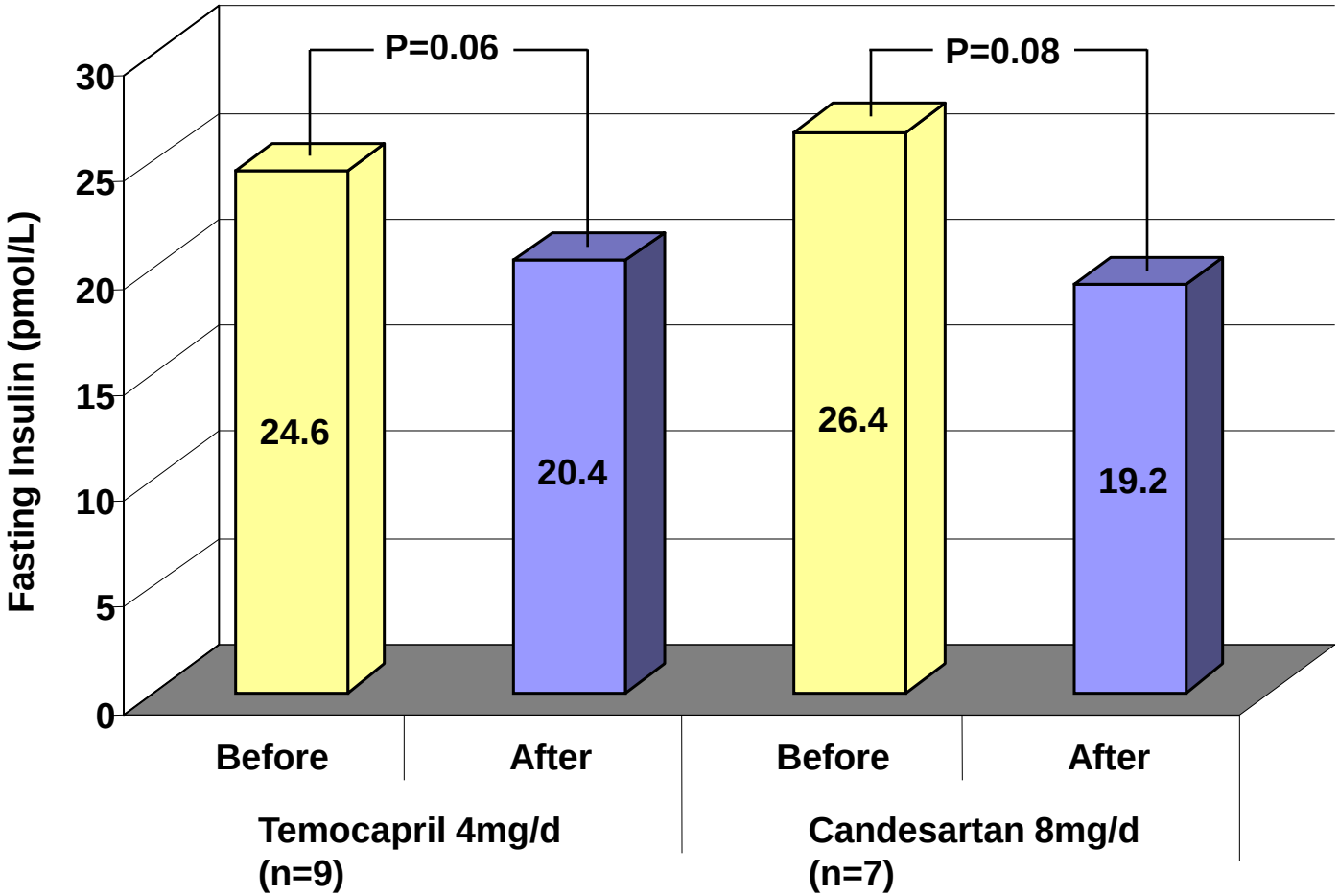
William J Elliott, Peter M Meyer. Incident diabetes in clinical trials of antihypertensive drugs: a network meta-analysis. Lancet 2007; 369: 201–07

RAS Blockade Increases Adiponectin In Hypertensive Patients



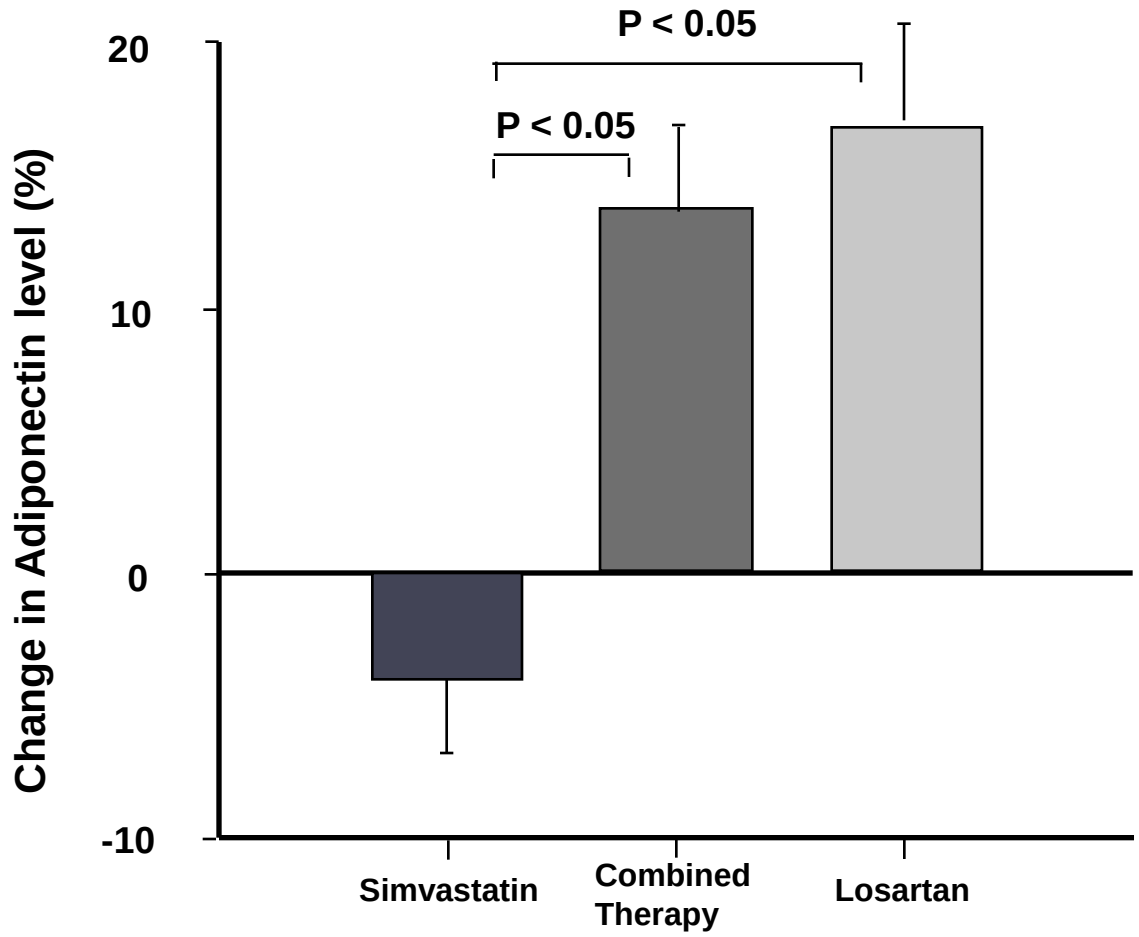
Masato Furuhashi et al. **Blockade of the Renin-Angiotensin System Increases Adiponectin Concentrations. in Patients With Essential Hypertension**. *Hypertension 2003, 42:76-81:*

Effect of RAS Blockade On Fasting Insulin in Hypertensives



Masato Furuhashi et al. **Blockade of the Renin-Angiotensin System Increases Adiponectin Concentrations. in Patients With Essential Hypertension**. *Hypertension 2003, 42:76-81:*

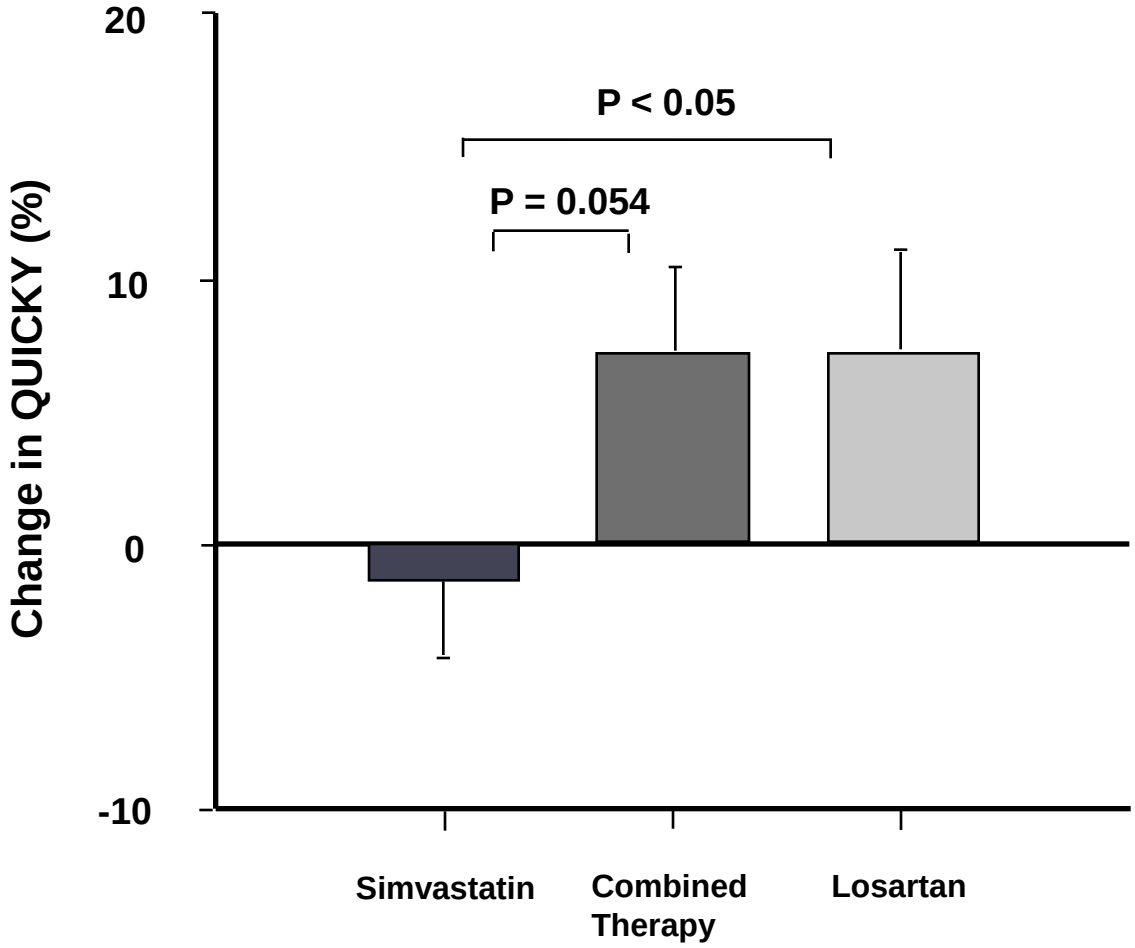
Effects of Simvastatin, Losartan, and Combined Therapy on Adiponectin Levels in Hypercholesterolemic, Hypertensive Patients (n=47)



P < 0.001 by ANOVA

Koh K. et al. **Additive Beneficial Effects of Losartan Combined With Simvastatin in the Treatment of Hypercholesterolemic, Hypertensive Patients,** *Circulation. 2004;110:3687*

Effects of Simvastatin, Combined Therapy, and Losartan on Insulin Sensitivity in Hypercholesterolemic, Hypertensive Patients (n=47)



P =0.029 by ANOVA

Koh K. et al. **Additive Beneficial Effects of Losartan Combined With Simvastatin in the Treatment of Hypercholesterolemic, Hypertensive Patients,** *Circulation. 2004;110:3687*

Outcome	Ramipril Group (N=4645)	Placebo Group (N=4652)	Relative Risk (95% CI)*	z Statistic	P Value†
	no. (%)				
Secondary outcomes‡					
Revascularization	742 (16.0)	852 (18.3)	0.85 (0.77–0.94)	−3.17	0.002
Hospitalization for unstable angina	554 (11.9)	565 (12.1)	0.98 (0.87–1.10)	−0.41	0.68
Complications related to diabetes§¶	299 (6.4)	354 (7.6)	0.84 (0.72–0.98)	−2.16	0.03
Hospitalization for heart failure	141 (3.0)	160 (3.4)	0.88 (0.70–1.10)	−1.16	0.25
Other outcomes					
Heart failure§	417 (9.0)	535 (11.5)	0.77 (0.67–0.87)	−4.09	<0.001
Cardiac arrest	37 (0.8)	59 (1.3)	0.62 (0.41–0.94)	−2.28	0.02
Worsening angina§	1107 (23.8)	1220 (26.2)	0.89 (0.82–0.96)	−2.91	0.004
New diagnosis of diabetes‖	102 (3.6)	155 (5.4)	0.66 (0.51–0.85)	−3.31	<0.001
Unstable angina with electrocardiographic changes‡	175 (3.8)	180 (3.9)	0.97 (0.79–1.19)	−0.30	0.76

*CI denotes confidence interval.

†P values were calculated with use of the log-rank test.

‡These events were centrally adjudicated.

§All cases are included, whether or not hospitalization was required.

¶Complications related to diabetes include diabetic nephropathy (defined as urinary albumin excretion of at least 300 mg per day or urinary protein excretion of 500 mg per day), the need for renal dialysis, and the need for laser therapy for diabetic retinopathy.

‖The denominator in the ramipril group is the 2837 patients who did not have diabetes at base line. The denominator in the placebo group is the 2883 patients who did not have diabetes at base line.

Salim Yusuf et al. EFFECTS OF AN ANGIOTENSIN-CONVERTING–ENZYME INHIBITOR, RAMIPRIL, ON CARDIOVASCULAR EVENTS IN HIGH-RISK PATIENTS. JANUARY 20, 2000. N Engl J Med. 2000;342:145

ADA 2013: STANDARDS OF MEDICAL CARE IN DIABETES

"ACE inhibitors ***should*** be considered for the initial treatment of hypertension, following appropriate reproductive counseling due to its potential teratogenic Effects"

Diabetes Care January 2013 vol. 36 no. Supplement 1 S11-S66

Conclusions

1. Diabetes and hypertension prevalence are expected to increase worldwide.

2. Coexistence of diabetes and hypertension in the same patient is greater than chance alone would predict

3. Local adipose tissue RAAS plays an important role y systemic Hypertension and insulin resistance

4. Ang II is able to block adipocyte differenciation through ATR1 and cause ectopic fat accumulation in liver and muscle.

5. ACEI's andARB's should be considered in hypertensive patients who have diabetes or obesity.

6. Nonetheless, lifestyle changes have demonstrated the best results

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DOI 10.1007/s11906-012-0292-5

ANTIHYPERTENSIVE THERAPY: PATIENT SELECTION AND SPECIAL PROBLEMS (K KARIO AND H RAKUGI, SECTION EDITORS)

Targeting Hypertension in Patients with Cardiorenal Metabolic Syndrome

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Dr. FELIX GOMEZ

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